Claims

1. A process of coating the surface of a substrate with catalytic components to form a catalyst, ~~where~~ wherein the catalyst is a catalyst matrix having two or more catalytic components which are layered successively on the substrate, comprising the following sequence of steps:

(a) infusing the substrate with more than an adequate amount of solution having a starting material comprising a catalytic component precursor, ~~where~~ wherein the thermal decomposition product of the catalytic component precursor is a catalytic component and ~~where~~ an adequate amount of solution is an amount that thoroughly coats the substrate;

(b) removing from the substrate any solution in excess of an adequate amount, thereby leaving a coating of the catalytic component precursor on the surface of the substrate;

(c) heating the coated substrate thereby converting the coating of the catalytic component precursor to the catalytic component by thermal decomposition,

(d) etching the coated substrate,

(e) repeating steps (a) - (c) for a second catalytic component.

2. The process of claim 1, wherein the sequence of steps (a), (b), and (c) is repeated in order to successively layer more than two catalytic components on the substrate.

3. The process of claim 1, wherein the substrate is a substrate selected from the group consisting of ceramics, glass, metals, and fabrics.

4. The process of claim 3, wherein the substrate is a ceramic substrate selected from the group consisting of beads, pellets, and monoliths.

5. The process of claim 4, wherein the ceramic substrate is a monolith.

6. The process of claim 1, wherein a first catalytic component is a metal oxide.

7. The process of claim 6, wherein the first catalytic component is a metal oxide selected from the group consisting of manganese oxide and tin oxide.

8. The process of claim 7, wherein the first catalytic component is tin oxide.

9. The process of claim 1, wherein a second catalytic component is a noble metal.

10. The process of claim 9, wherein the second catalytic component is a noble metal selected from the group consisting of platinum and palladium.

11. The process of claim 10, wherein the second catalytic component is platinum.

12. The process of claim 2, wherein a third catalytic component is a metal ~~oxide and this metal oxide is used as a promoter, where the promoter is a catalytic component which increases the activity or catalyzing rate of the catalyst.~~

13. The process of claim 12, wherein the third catalytic component is a metal oxide selected from the group consisting of the oxides of manganese and iron.

14. The process of claim 13, wherein the third catalytic component is iron oxide.

15. The process of claim 2, wherein the catalyst has three catalytic components.

16. The process of claim 15, wherein the three catalytic components are a first metal oxide, a second metal oxide, and a noble metal.

17. The process of claim 16, wherein the first metal oxide is tin oxide, the second metal oxide is iron oxide, and the noble metal is platinum.

18. The process of claim 1, wherein the substrate, now coated with one or more catalytic components, is heated in an atmosphere containing a reducing gas.

19. The process of claim 18, wherein the reducing gas is either carbon monoxide or hydrogen.

20. The process of claim 1, wherein step (a) is modified so that the substrate is infused with an excess of the solution by vacuum deaeration.

21. The process of claim 1, wherein step (b) is modified so that the excess of the solution is removed by draining away and/or evaporating off the excess of the solution.

22. The process of claim 1, wherein step (c) is modified so that the heating of the coated substrate is to approximately 300 degrees Celsius.

23. The process of claim 1, wherein said process is used for the oxidation of carbon monoxide.

Sub a1

24. The process of claim 1, wherein said process is used for the oxidation of volatile organic compounds.